



CASE PP/1-21421/A/CGM 432/DIV

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF

KURT HOFFMANN ET AL

APPLICATION NO: 09/879,422

FILED: JUNE 12, 2001

FOR: DUST-FREE, EPOXY-CONTAINING

STABILIZER GRANULES AND THE

PREPARATION PROCESS

Group Art Unit: 1712

Examiner: R. Sellers

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Commissioner for Patents

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**REPLY BRIEF**

Sir:

The following remarks are directed to certain points of argument in the Examiner's Answer to Appellants' Appeal Brief. The Examiner's Answer was mailed on May 27, 2003. Hence this brief is being timely filed. Appellants respectfully submit this Reply Brief for entry and consideration in the appeal of this case.

On page 4, last paragraph of the Examiner's response, the Examiner asserts equivalency between the bisphenol A diglycidyl ether (Bis-A DBE) and the epoxidized oil of Molenaar et al. (page 10, lines 28-32; page 11, lines 9-11 and page 24, lines 32 and 34, ESO and BIS E in GB '637). The Applicant maintains their original objections to this equivalency. As previously argued in the Applicant's brief,

the liquid epoxy of Molenaar et al. acts as a plasticizer which binds the other additives to give a dust-free blend. It would not be obvious to take the solid Bis-A DBE stabilizer used directly in acrylonitrile-butadiene-styrene (GB '637) and in damaged thermoplastics (PCT '377) and replace the epoxylized soy oil of Molenaar et al. (example 1) to give *low-dust additive granules*.

Column 5, lines 15 through 20 of Molenaar et al. disclose "It is in general not advisable that the granules departing the device have a temperature of above 40° C." The instant invention requires the outlet die temperature to be a minimum of 60° C. The replacement of the epoxylized oil of Molenaar et al. by Bis-A DBE as the epoxy would give a product that simply would not extrude at temperatures at or below 40° C.

Bis-A DBE are known to be highly brittle materials. See L.V. McAdams, J. A. Gannon, *Encyclopedia of Polymer Science and Engineering*, Vol. 6, John Wiley and Sons, Inc, 1986, p. 363:

Unmodified epoxy resins based on bisphenol A-epichlorohydrin exhibit brittleness and low elongation after curing with hardeners, eg, polyamines and anhydrides. Aliphatic diepoxide diluents enhance the flexibility by providing chain segments with greater free rotation between cross-links."

No practitioner would expect Bis-A DBE (brittle) to be a replacement for the epoxylized soy oil (chain segment providing greater flexibility) of Molenaar et al.

Examiner states on page 5, second paragraph that the PCT '377 publication (page 26, Table 6) shows a reduction of melt flow rate (MFR) when the Bis-A-DBE is added to the damaged thermoplastic. The Examiner further states that this property effect along with the fact that the Bis-A-DBE improves resistance to discoloration (GB '637) makes it obvious to incorporate the Bis-A-DBE as a stabilizer additive to the dust-free or low-dust granular formulations of Molenaar et al. and EP '824. The Applicants point out that the Table 6 of PCT '377 shows the Bis-A-DBE within a regranulated PP battery container material. This reduces the MFR for the *polymer additive mixture*. Bis-A-DBE would not necessarily reduce the MFR for the blend of additives *only* as in the instant invention. Nor is there any indication in Molenaar et al. or EP '824 that the MFR is an important property for deciding what components will or will not work in an extruded low-dust granule. Hence it would not make replacement of the epoxy of Molenaar et al. with Bis-A-DBE obvious nor would it suggest such a replacement.

The Applicants agree that the instant invention constitutes a product-by-process for low-dust granules. The Examiner argues on page 6 of his answer "If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. (*In re Thorpe*, 227 USPQ 964, 966 Federal Circuit 1985 and MPEP § 2113)". The examiner further states that the burden of proof falls on the applicant. Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. (*In re Marosi*, , 218 USPQ 289, 292 Federal Circuit 1983 and MPEP § 2113). The Examiner presumes that there is motivation in GB '637 and PCT '377 to combine the additive packages disclosed therein and to apply them to the processes of Molenaar et al. and/or EP'824. This is essentially hindsight speculation by the Examiner. Without motivation to combine the cited references, the product-by-process burden on the Applicant is not valid. While the Great Britain patent and PCT publication do suggest using the bisphenol A diglycidyl ether as an additive, there would be no motivation to take this additive as a binding agent for the phenolic and phosphite ingredients. And although Molenaar et al. does use an epoxy plasticizer as a binding agent, there is no suggestion that bisphenol A diglycidyl ether would work as such. To the contrary, the solid epoxy would not be expected to function as a solvent or binding agent.

In conclusion, in view of the foregoing reasons as well as those set forth in the Appeal Brief, appellants respectfully submit that the rejections of the instant claims are in error as to fact and law and should be reversed.

Respectfully submitted,



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Enclosure: Copy of page 363, Vol. 6, *Encyclopedia of Polymer Science and Engineering*.

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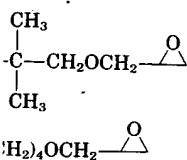
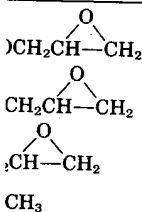
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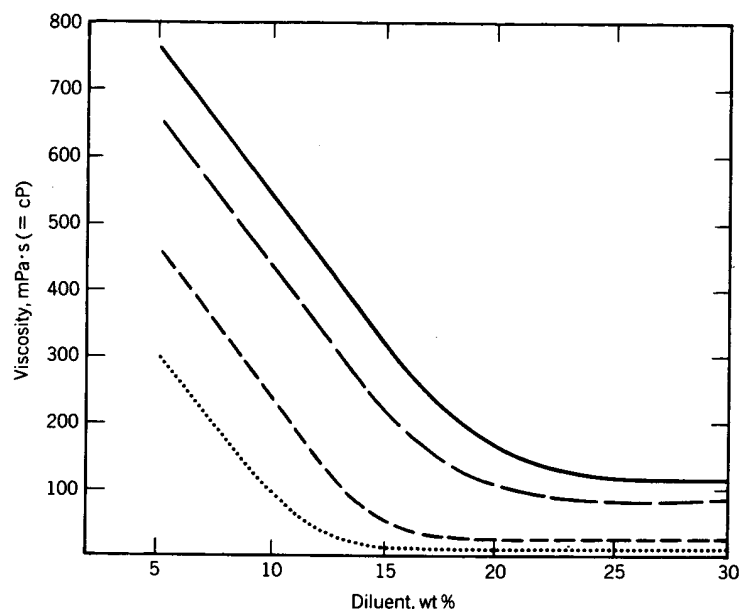


Fig. 5. Reduction of DGEBA viscosity by reactive diluents: —, cresyl glycidyl ether; — — —, butanediol diglycidyl ether; - - - - -, C<sub>12</sub>-C<sub>14</sub> aliphatic glycidyl ether; ·····, butyl glycidyl ether.

inorganic, and spheroidal, granular, fibrous, or lamellar in shape. The properties of commercial fillers are given in Table 14, and the effects on epoxy resins in Tables 15 and 16.

Effects (Table 16) depend more on filler amount than type. Loading is often limited by the maximum viscosity allowable for a given application. The viscosity can be modified by diluents or rise in temperature.

The heat of reaction liberated upon cure is a serious limitation to the use of epoxy resins in bulk castings. Fillers absorb part of the heat evolved and reduce the overall shrinkage during cure and the coefficient of thermal expansion.

Powdered metal oxides depress the ultimate tensile and compressive strengths, but have little effect on impact strength and increase compressive yield strengths.

**Toughening Agents and Flexibilizers.** Unmodified epoxy resins based on bisphenol A-epichlorohydrin exhibit brittleness and low elongation after curing with hardeners, eg, polyamines and anhydrides. Aliphatic diepoxide diluents enhance the flexibility by providing chain segments with greater free rotation between cross-links. Polyaminoamide hardeners, based on aliphatic polyamines and dimerized fatty acids, perform similarly. Liquid polysulfide polymers possessing terminal mercaptan functionality improve impact properties in conjunction with polyamine hardeners.

Flexible chain segments are incorporated in an epoxy resin by oligomeric aliphatic polyesters containing carboxylic acid end groups forming an epoxy resin adduct. Liquid butadiene-acrylonitrile copolymers containing terminal carboxyl groups provide flexibilization by inclusion of rubbery segments in the epoxy resin chain.